

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
 United States Patent and Trademark
 Office
 Box PCT
 Washington, D.C.20231
 ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

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| Date of mailing (day/month/year) 06 September 1999 (06.09.99) | |
| International application No. PCT/GB99/00044 | Applicant's or agent's file reference PBA/DO88081PWO |
| International filing date (day/month/year) 18 January 1999 (18.01.99) | Priority date (day/month/year) 16 January 1998 (16.01.98) |
| Applicant MOULE, Robert et al | |

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

13 August 1999 (13.08.99)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

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| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35 | Authorized officer Lazar Joseph Panakal Telephone No.: (41-22) 338.83.38 |
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PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

ATKINSON, P.
MARKS & CLERK
Sussex House
83-85 Mosley Street
MANCHESTER M2 3LG
GRANDE BRETAGNE

11 MAY 2000

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year)

09.05.00

Applicant's or agent's file reference
PBA/DO88081PWO ✓

IMPORTANT NOTIFICATION

International application No
PCT/GB99/00044

International filing date (day/month/year)
18/01/1999

Priority date (day/month/year)
16/01/1998

Applicant
FOOD GUARDIAN LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



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D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
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Authorized officer

Weber, R

Tel. +49 89 2399-2362



REC'D 10 MAY 2000

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| | | |
|--|---|--|
| Applicant's or agent's file reference PBA/DO88081PWO | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/GB99/00044 | International filing date (day/month/year) 18/01/1999 | Priority date (day/month/year) 16/01/1998 |
| International Patent Classification (IPC) or national classification and IPC G01K3/04 | | |
| Applicant FOOD GUARDIAN LIMITED et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 7 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

| | |
|---|--|
| Date of submission of the demand 13/08/1999 | Date of completion of this report 09.05.00 |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized officer Weaver, M Telephone No. +49 89 2399 2825  |

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/00044

I. Basis of this report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-7 as originally filed

Claims, No.:

1-16 as originally filed

Drawings, sheets:

1/1 as received on 03/04/2000 with letter of 03/04/2000

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.
☒ claims Nos. 15.

because:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/00044

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 15 are so unclear that no meaningful opinion could be formed (*specify*):
- see separate sheet**
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☐ no international search report has been established for the said claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | |
|-------------------------------|------------------------|
| Novelty (N) | Yes: Claims 1 - 14, 16 |
| | No: Claims |
| Inventive step (IS) | Yes: Claims 1 - 14, 16 |
| | No: Claims |
| Industrial applicability (IA) | Yes: Claims 1 - 14, 16 |
| | No: Claims |

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/00044

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. Claim 15 is so unclear (Article 6 PCT) that it is not possible to assess its patentability.

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. The invention concerns a marking element for indicating whether a pre-defined temperature condition has been maintained.

Problem: The most relevant document of the prior art is D1= US-A-5 597 238 which discloses a marking element comprising a first material capable of flowing above a predetermined temperature separated from a second absorbent material by a heat disruptable barrier layer, the first and second materials being such that when the barrier layer is punctured and the predetermined temperature is exceeded, the first material flows in the second material to produce a detectable change. However, in D1, the disruption of the barrier layer is effected by means of an external heated probe.

Solution: according to the claimed device, in which the heat disruptable barrier layer is comprised of a heat disruptable material associated with an element capable of being inductively heated by electromagnetic energy to effect disruption of said material. The claimed marking element avoids the need to apply a heated probe individually to each such marking element in order to disrupt the barrier layer.

Claim 1 is considered as novel and involving an inventive step (Articles 33(2) and 33(3) PCT).

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/00044

2. A method of activating a marking element as disclosed in Claim 13 is also considered as novel and involving an inventive step (Articles 33(2) and 33(3) PCT).
3. A barrier material comprising a heat disruptable material associated with an element capable of being inductively heated by electromagnetic energy to effect disruption of said material as disclosed in Claim 14 is also considered as novel and involving an inventive step (Articles 33(2) and 33(3) PCT).
4. A method of disrupting a barrier material as claimed in Claim 16 is also considered as novel and involving an inventive step (Articles 33(2) and 33(3) PCT).
5. Claims 2 to 12 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step (Articles 33(2) and 33(3) PCT).

Re Item VII

Certain defects in the international application

1. According to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 should be mentioned in the description and this document should be identified therein.

Re Item VIII

Certain observations on the international application

1. The features of all the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
2. The independent claims should be in the two-part form in accordance with Rule 6.3(b) PCT, with those features known in combination from the prior art (document

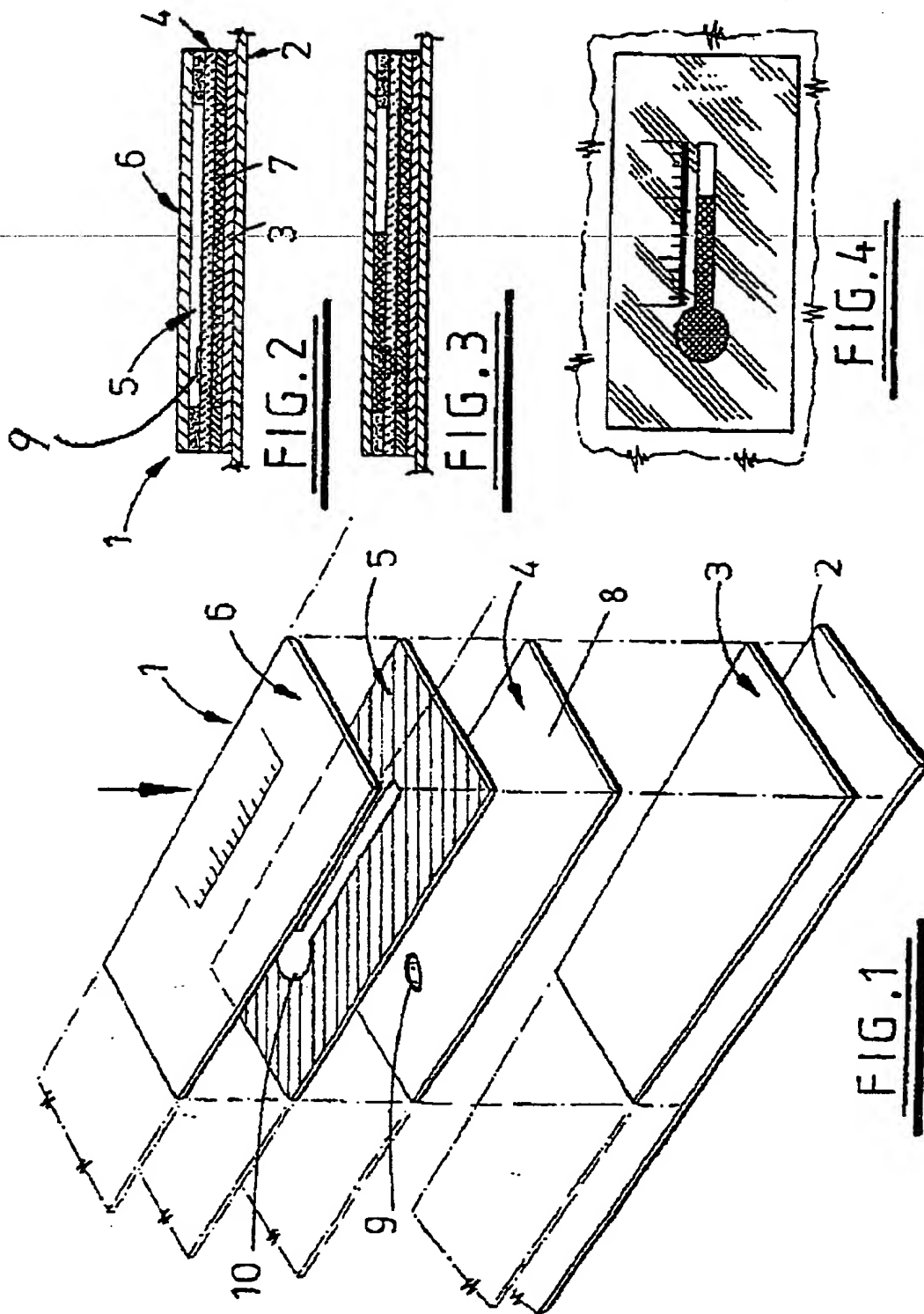
**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/00044

D1) being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).

The independent claims should therefore be redrafted accordingly. If, however, the applicant is of the opinion that the two-part form would be inappropriate, then reasons therefor should be provided in the letter of reply. In addition, the applicant should ensure that it is clear from the description which features of the subject-matter of the independent claims are known from document D1 (see the PCT Guidelines PCT/GL/3 III, 2.3a).

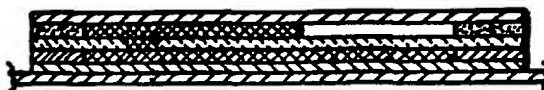
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

| | | |
|---|-----------|---|
| (51) International Patent Classification ⁶ : G01K 3/04 | A1 | (11) International Publication Number: WO 99/36755 (43) International Publication Date: 22 July 1999 (22.07.99) |
| (21) International Application Number: PCT/GB99/00044 (22) International Filing Date: 18 January 1999 (18.01.99) (30) Priority Data: 9800814.7 16 January 1998 (16.01.98) GB (71) Applicant (for all designated States except US): FOOD GUARDIAN LIMITED [GB/GB]; Ashfields, Leigh Sinton, Malvern, Worcestershire WR13 5DH (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): MOULE, Robert [GB/GB]; Chygurno Lamorna, Penzance TR19 6XH (GB). MOULE, Simon [GB/GB]; 42 Endymion Road, London N4 1EQ (GB). (74) Agent: ATKINSON, Peter, Birch; Marks & Clerk, Sussex House, 83-85 Mosley Street, Manchester M2 3LG (GB). | | (81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> |
| (54) Title: BARRIER MATERIALS AND PRODUCTS PRODUCED THEREWITH (57) Abstract A marking element (1) for indicating whether a pre-defined temperature condition has been maintained. The element comprises a first material (7) capable of flowing above a predetermined temperature separated from a second absorbent material (5, 10) by a heat disruptable barrier layer (4). The first and second materials are such that when the barrier layer is punctured and the predetermined temperature is exceeded the first material flows in the second material to produce a detectable change. The heat disruptable barrier layer (4) is comprised of a heat disruptable material (8) associated with an element (9) capable of being inductively heated by electromagnetic energy to effect disruption of said material thereby to activate the marking element. | | |



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BARRIER MATERIALS AND PRODUCTS PRODUCED THEREWITH

The present invention relates to heat disruptable barrier materials (particularly but not exclusively thin plastics films), to the disruption of such materials, and to products incorporating these materials.

There are numerous examples of products incorporating barrier materials which must be disrupted (e.g. punctured) to allow communication between both sides of the barrier. Examples of such products include containers which contain food to be microwaved and which are covered with a film or the like which must be punctured prior to the food being microwaved to ensure that steam is vented from the container. Whilst it may be a relatively simple task manually to puncture the film for a single product item, it obviously becomes time consuming to repeat the operation for a plurality of items, e.g. for catering on a commercial scale.

A further problem of puncturing barrier layers occurs when the barrier is beneath a further layer which itself must not be punctured. A particular example of this problem is encountered in the marking element disclosed in WO-A-9208113 which is used for indicating whether a product has been maintained under a particular temperature or temperature-time condition. More particularly the marking element as manufactured comprises an ink separated from an absorbent wick by a heat disruptable film, all of these components being provided beneath an upper film layer of higher melting/softening temperature than the heat disruptable film.

By way of further explanation, the marking element may be one which is to be used for indicating whether frozen food has been stored at a higher temperature (e.g. room temperature) than is required. As such, the ink is one which is (i) not capable of flowing at the correct storage temperature of the food, but (ii) capable of flowing at or above the temperature at which the food should not be stored. When the marking element is manufactured it is necessary to ensure that the ink (which will flow at the

manufacturing temperature) is separated from the wick - hence the need for the barrier layer.

Subsequent to manufacture, the marking element is cooled down (either before or after application to the product to be monitored) to a temperature at which the ink will not flow. The element is then "activated" by application of a heated probe to the upper film layer. This probe is at a temperature at which it does not disrupt the outer film layer but is capable of puncturing the heat disruptable layer so as to allow the ink to reach the wick. If the temperature the product increases beyond a predetermined value then the ink is capable of flowing in the wick to provide an indication of the undesired increase in temperature.

Whilst such marking elements function in a perfectly satisfactory manner, the need to use a heated probe makes it difficult to activate the elements, particularly if they have already been applied to the product to be monitored.

It is an object of the present invention to obviate or mitigate the abovementioned disadvantages.

According to a first aspect of the present invention there is provided a marking element for indicating whether a pre-defined temperature condition has been maintained comprising a first material capable of flowing above a predetermined temperature separated from a second absorbent material by a heat disruptable barrier layer, the first and second materials being such that when the barrier layer is punctured and the predetermined temperature is exceeded the first material flows in the second material to produce a detectable change wherein the heat disruptable barrier layer is comprised of a heat disruptable material associated with an element capable of being inductively heated by electromagnetic energy to effect disruption of said material.

According to a second aspect of the present invention there is provided a method of activating a marking element as defined in the previous paragraph, the method comprising subjecting the marking element to electromagnetic energy capable of inductively heating said inductive heatable element to effect disruption of the barrier layer.

The heat disruptable material may for example be a film, most preferably a plastics film.

The inductively heatable element may be of any material with the requisite conductivity, e.g. metal, carbon or a conductive plastics or polymeric material. Conveniently the inductively heatable element is provided by a marking of an electrically conductive (e.g. metallic) ink or patch on or otherwise associated with the heat disruptable material. Further possibilities for the element are a foil, sheet or film of a metal. A still further possibility is a marking of a graphite (carbon) loaded ink.

The inductively heatable element may be on either side of, or within, the barrier material and may be of any desired shape appropriate to the electromagnetic energy to be used, e.g. a disc or an annulus. The annulus may be of uniform width across its inner and outer edges (e.g. as provided by two concentric circles) or may have one or more "restrictions" around its width.

Preferably also the electromagnetic energy for inductively heating the element is radiofrequency energy (10^4 Hz to 3×10^{12} Hz). Preferably the frequency is from 50 kHz to 1 MHz more typically 100 kHz to 500 kHz, e.g. 160 kHz to 180 kHz. The power may be 100 W to 1000 W, typically 500 W.

In the marking element according to the invention, the barrier layer together with the first and second materials may be provided beneath an outer layer (e.g. an

outer film layer). The barrier layer may be selectively disrupted by the use of electromagnetic energy of the appropriate frequency thus avoiding the need for the outer covering layer to be of a higher melting/softening temperature than the barrier layer and the need to use a heated probe. A related advantage is that the marking element may be activated simply by positioning the element (e.g. *in situ* on a product to be "monitored" by the element) close to an electromagnetic field of the appropriate frequency to effect disruption of the barrier layer. This is a much more convenient technique to the use of a heated probe.

The barrier material as employed in the marking element is an important feature of the invention in its own right and therefore according to a third aspect of the present invention there is provided a barrier material comprised of a heat disruptable material associated with an element capable of being inductively heated by electromagnetic energy to effect disruption of said material.

According to a fourth aspect of the present invention there is provided a method of disrupting a barrier material as defined in the previous paragraph, the method comprising subjecting the barrier material to electromagnetic energy capable of inductively heating said element to effect disruption of the material.

The electromagnetic energy may be microwave energy such that the barrier material of the invention may be used, for example, as a covering for a container which is intended to be heated in a microwave oven. As such, the microwave energy effects inductive heating of the element resulting in the disruption of the covering. As such the need for manual puncturing is avoided.

The barrier material of the invention is particularly suitable for use in products in which a barrier to be punctured is provided beneath at least one further layer which is required to remain intact since using electromagnetic energy it is possible selectively to disrupt the barrier layer.

The invention will be further described by way of example only with reference to the accompanying drawings, in which:

Fig. 1 is an exploded perspective view of one embodiment of marking element in accordance with the first aspect of the invention;

Fig. 2 is a cross-section of the marking element illustrated in Fig. 1 prior to activation thereof;

Fig. 3 is a cross-section similar to Fig. 2 but shows the marking element in an activated condition and also indicating that a product has been stored above a predetermined temperature; and

Fig. 4 is a plan view of the label in the condition shown in Fig. 3.

As shown in Fig. 1, a marking element 1 in accordance with the invention is removably mounted on a carrier sheet 2 and is a laminar structure comprised of layers 3-6 described in more detail below and an ink 7 (not shown in Fig. 1 but see Fig. 2).

In more detail, the layer 4 is comprised of a heat disruptable plastics film 8 provided with an inductively heatable element in the form of a marking 9 of an inductively heatable conductive ink. Alternatively the inductively heatable element may for example be provided by a thin metal disc or a metal joint. At its undersurface, barrier layer 4 is bonded around its peripheral surface to the corresponding area of the upper surface of the layer 3 so that a reservoir space (in which the ink 7 is located) is formed between the layers 3 and 4. The undersurface of layer 3 is releasably attached to carrier 2 so that the label 1 may be removed therefrom and attached (by the adhesive) to a product to be monitored.

The indicator layer 5 is of paper which has been treated with a resin so that only a central area 10 (shown in Fig. 1 in the shape of a thermometer) remains absorbent, the remaining area of the layer 5 as depicted by the hatched lines being non-absorbent. The undersurface of layer 5 is bonded in the hatched areas to the upper surface of the barrier layer 4 and it will be noted from Fig. 1 that the marking 9 of reflective ink (on the barrier layer 4) locates immediately beneath the "bulb" of the thermometer-shaped absorbent area 10 of indicator layer 5.

Layer 6 is a clear plastics layer which overlies, and is bonded to the indicator layer 5. The absorbent area 10 is of contrasting colour to the ink 7.

In the marking element 1 as shown in Figs. 1 and 2, the barrier layer 4 prevents contact between the ink 7 and the absorbent area 10 of indicator layer 5. The ink 7 is one which (once the barrier layer has been disrupted - see below) is only capable of flowing in the absorbent area 10 of layer 5 if the label 1 is above a predetermined temperature. The ink may, for example, comprise an alkyl (particularly a C_{1-4} alkyl) ester of a long-chain fatty acid. Examples of esters which may be used include ethyl myristate, butyl myristate and butyl laurate. It will of course be appreciated that the ink may comprise a mixture of esters to ensure that the ink flows above a particular temperature. A further possibility is for the ink to comprise a polymeric material which reversibly fuses above a predetermined temperature, e.g. a thermo-reversible wax. Inorganic salts (e.g. sodium or potassium chloride) can also be incorporated in the polymeric material for providing the required temperature of fusion.

For the purposes of "activation", the label 1 is subjected to a temperature at which the ink 7 will not flow. Subsequently, the label 1 (which may be attached to the product to be monitored) is placed close to an electromagnetic field or sufficient energy (flux density) to effect inductive heating of the ink 9. This causes disruption

(puncturing) of the film 8 beneath the "bulb" of the absorbent area 10 of layer 5 which therefore comes into communication with the reservoir of ink 7.

Provided that the product to which the marking element 1 is attached is maintained below a predetermined temperature, the ink is unable to flow (or at least unable to flow to any substantial extent) and does not colour the absorbent area 10. If however the product is raised above the permitted temperature then the ink will flow into, and indelibly mark, the area 10 as depicted in Figs. 3 and 4.

Barrier materials of similar construction to layer four may be used in applications other than a marking element. Such layers may, for example, be used as a covering for a container which is intended to be heated in a microwave oven such that inductive heating of the inductively heatable element results in disruption of the covering.

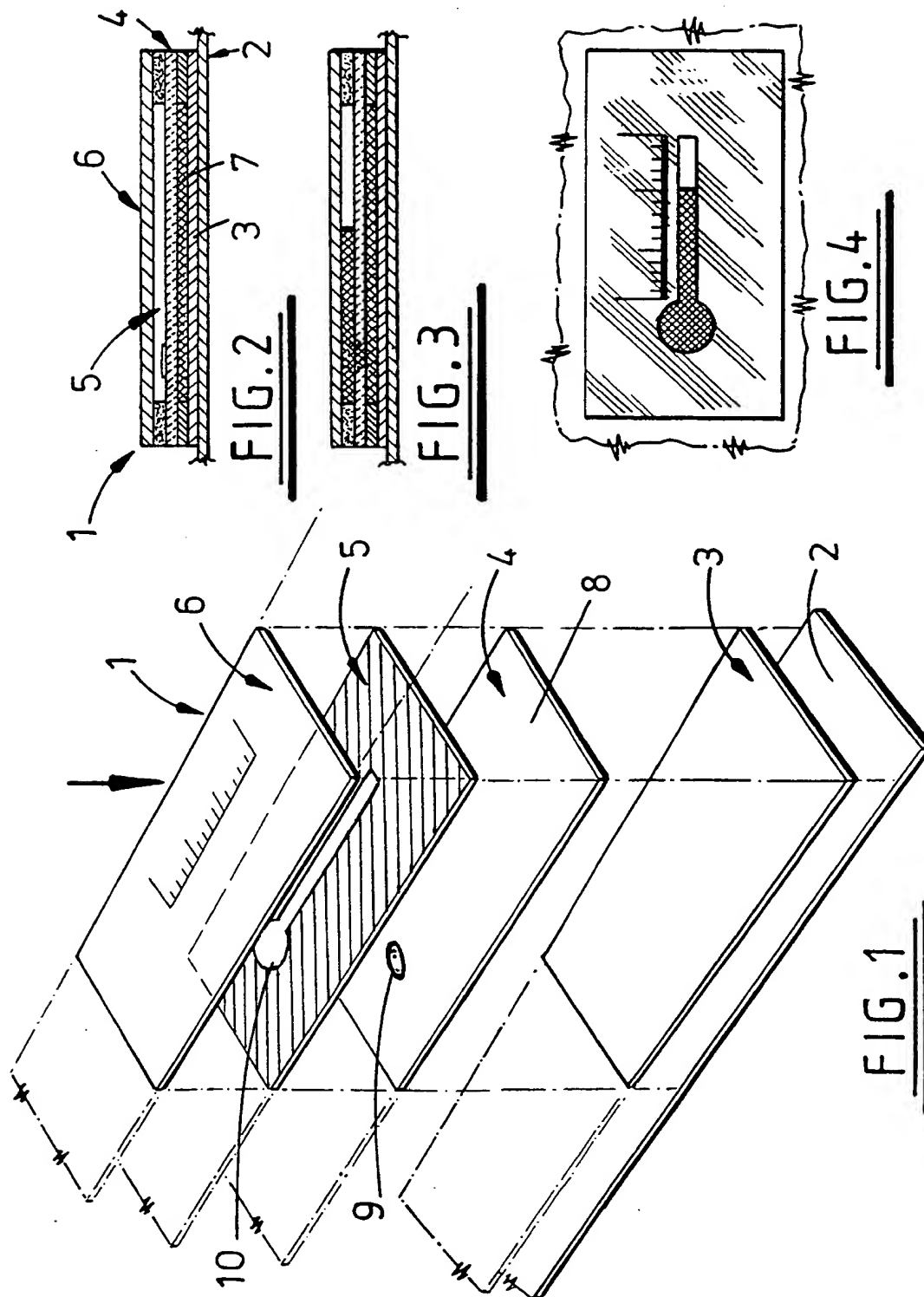
CLAIMS

1. A marking element for indicating whether a pre-defined temperature condition has been maintained comprising a first material capable of flowing above a predetermined temperature separated from a second absorbent material by a heat disruptable barrier layer, the first and second materials being such that when the barrier layer is punctured and the predetermined temperature is exceeded the first material flows in the second material to produce a detectable change wherein the heat disruptable barrier layer is comprised of a heat disruptable material associated with an element capable of being inductively heated by electromagnetic energy to effect disruption of said material.
2. A marking element as claimed in claim 1 comprising a lower layer which, together with the heat disruptable barrier layer, forms a reservoir for the first material, and an absorbent layer provided on the opposite side of the barrier layer to said reservoir.
3. A marking element as claimed in claim 1 or 2 wherein the absorbent layer is overlaid by a transparent film.
4. A marking element as claimed in any one of claims 1 to 3 wherein the heat disruptable material is a film.
5. A marking element as claimed in claim 4 wherein the heat disruptable material is a plastics film.
6. A marking element as claimed in any one of claims 1 to 5 wherein the inductively heatable element is provided on the heat disruptable material.

7. A marking element as claimed in any one of claims 1 to 6 wherein the inductively heatable element is provided by a conductive ink.
8. A marking element as claimed in claim 7 wherein the conductive ink is a metallic ink or a graphite loaded ink.
9. A marking element as claimed in any one of claims 1 to 6 wherein the inductively heatable element is provided by metal, carbon or an electrically conductive plastics or polymeric material.
10. A marking element as claimed in claim 9 wherein the inductively heatable element is of metal in the form of a film, sheet or foil.
11. A marking element as claimed in any one of claims 1 to 10 wherein the barrier layer is disruptable by radiofrequency energy.
12. A marking element as claimed in any one of claims 1 to 10 which is disruptable by microwave energy.
13. A method of activating a marking element as claimed in any one of claims 1 to 12, the method comprising subjecting the marking element to electromagnetic energy capable of inductively heating said inductive heatable element to effect disruption of the barrier layer.
14. A barrier material comprised of a heat disruptable material associated with an element capable of being inductively heated by electromagnetic energy to effect disruption of said material.
15. A barrier material as claimed in claims 13 which is as defined in anyone of claims 1 to 12.

16: A method of disrupting a barrier material as claimed in claim 14 or 15, the method comprising subjecting the barrier material to electromagnetic energy capable of inductively heating said element to effect disruption of the material.

1-1



PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|--|---|--|
| Applicant's or agent's file reference PBA/D088081PW0 | FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. | |
| International application No. PCT/GB 99/ 00044 | International filing date (day/month/year) 18/01/1999 | (Earliest) Priority Date (day/month/year) 16/01/1998 |
| Applicant FOOD GUARDIAN LIMITED et al. | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

3

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/00044

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G01K3/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G01K B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|----------------------------|
| Y A | DE 16 48 263 A (MICHEL J) 6 April 1972 see page 6 - page 7; figures --- | 1,4,13 6,9-11, 14-16 |
| Y A | US 5 597 238 A (COLLEY TERENCE ET AL) 28 January 1997 see abstract; figures --- | 1,4,13 2,3 |
| A | US 5 231 268 A (PARKS CHRISTOPHER J ET AL) 27 July 1993 see abstract --- | 1,7,12 |
| A | EP 0 356 169 A (CAMPBELL SOUP CO) 28 February 1990 see abstract --- -/-- | 1,12 |

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

19 April 1999

Date of mailing of the international search report

29/04/1999

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/00044

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| A | EP 0 462 767 A (GEN FOODS INC) 27 December 1991 see the whole document ----- | 1, 12 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/00044

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
|---|---|---------------------|--|--|
| DE 1648263 | A | 06-04-1972 | NONE | |
| US 5597238 | A | 28-01-1997 | NONE | |
| US 5231268 | A | 27-07-1993 | AU 3400393 A CA 2090838 A EP 0559447 A JP 6032378 A NZ 247052 A | 09-09-1993 05-09-1993 08-09-1993 08-02-1994 27-04-1995 |
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| EP 0462767 | A | 27-12-1991 | US 5039001 A AT 119845 T AU 629128 B AU 7835891 A CA 2043659 A DE 69108115 D DE 69108115 T DK 462767 T ES 2075355 T HK 184096 A JP 4231920 A | 13-08-1991 15-04-1995 24-09-1992 19-12-1991 19-12-1991 20-04-1995 20-07-1995 22-05-1995 01-10-1995 11-10-1996 20-08-1992 |